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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/470,360	12/22/1999	KIMBERLY ANN HORAN	C-7197	6049

7590

09/30/2002

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EXAMINER

OH, TAYLOR V

ART UNIT

PAPER NUMBER

1625

DATE MAILED: 09/30/2002 411

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n N .	Applicant(s)	
	09/470,360	HORAN ET AL.	
	Examiner	Art Unit	
	Taylor Victor Oh	1625	

-- The MAILING DATE of this communicati n appears on th c ver she t with the corresp ndence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2002 .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ . | 6) <input type="checkbox"/> Other: _____ . |

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1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/23/2002 has been entered.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Papa et al (U.S. 5,231,222) in view of Spiske et al (U.S. 5,248,427).

Papa et al teaches a process of producing an ester compound by reacting an alcohol having an 2 to 5 carbon atoms with a carboxylic acid with 1 to 4 carbon atoms in the presence of an esterification catalyst (see col. 3, lines 9-17) in the following steps:

- a. removing the reaction products such as ester and water from the reactor by distillation,
- b. forming a water-ester azeotrope by the addition of water (e.g. 25-30%) (see col 6 ,lines 65-68),
- c. separating the water-ester azeotrope in a separate vessel to isolate the desired ester (see col. 2 , lines 45-51).

The Papa et al reference, however, differs from the instant invention in that there is no mention for the organic phase to be dried by the use of the membrane separation unit , the dried organic stream is directed to the distillation means, and an azeotrope contains 10 wt. % or less of water .

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Spiske et al discloses a process for removing water by means of a membrane from the reaction mixture obtained from the preparation of carboxylic esters by the reaction of alcohols and carboxylic acids in the presence of an acidic catalyst (see col. 1 , lines 43-48). Furthermore, in the process , the removal of water from not only a mixture of water and an alcohol, but also a carboxylic acid or a carboxylic ester can be conducted by the membrane (see col. 1 ,lines 35-41).

Concerning the dried organic stream directed to the distillation means, this is directly related to the further purification of the impure dried organic stream containing ethyl acetate. Therefore, if the skillful artisan in the art had desired to further purify some of the dried organic stream containing ethyl acetate, it would have been obvious for the skillful artisan to have employed the distillation apparatus after Spiske et al's membrane unit treatment , thereby improving the purity of the desired product.

With respect to the formation of the azeotrope containing 10 wt. % or less of water, the Papa et al reference teaches that a water-ester azeotrope is formed by the addition of water (e.g. 25-30%); also, it points out that the addition of some water to the distillation column is recommended to aid in forming the product ester-water azeotrope but the high content of water is to be avoided (see col. 7 , lines 1-8). However, if applicants should consider the subject matter of the claims novel, then applicants should file a Declaration concerning an unexpected result obtained from the side-by-side comparison data between the first prior art and the current invention. Therefore, if the person having an ordinary skill in the art had desired to obtain an optimum level of the water content in the azeotrope for the process, it would have been obvious

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for the skillful artisan in the art to have obtained the claimed water content in the azeotrope by a routine experimentation of Papa et al's water content in the azeotrope .

Papa et al expressly teaches the process of producing the ester compound by reacting the alcohol having an 2 to 5 carbon atoms with the carboxylic acid with 1 to 4 carbon atoms in the presence of the esterification catalyst through the azeotropic distillation. And Spiske et al does teach the process for removing water by means of a membrane from the reaction mixture obtained from the preparation of carboxylic esters by the reaction of alcohols and carboxylic acids in the presence of the acidic catalyst; furthermore, in the process , the removal of water from not only the mixture of water and the alcohol, but also the carboxylic acid or the carboxylic ester can be conducted by the membrane (see col. 1 ,lines 35-41).

Both have been involved with the process of making the carboxylic ester. Papa et al does teaches the process of producing the ester compound through the azeotropic distillation ; Spiske et al does teach the process for removing water by means of the membrane from the reaction mixture obtained from the preparation of carboxylic esters, thereby minimizing the cost of operation during the process (see col. 1 ,lines 24-28) . Therefore, it would have been obvious to the skillful artisan in the art to have motivated to incorporate Spiske et al's the membrane separation unit into the Papa et al's esterification process with an expectation of a similar success in the Spiske et al process , thereby facilitating the removal of water in the process as well as improving the purity of the desired product because the application of the Spiske et al to the Papa

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et al process would improve the phase separation by means of the membrane separation unit during the esterification and also would reduce the cost of the operation .

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Powanda et al (U.S. 4,868,329) discloses a process for the preparation of carboxylic acid esters in which a carboxylic acid and an aliphatic mono or polyol by maintaining one of the reactants in the reactor at a high temperature and adding the other reactants over a period of time.

Fujita et al (U.S. 4,250,328) discloses a method of separating esters from a reaction mixture composed of ester, alcohol, organic acid and water. In the reaction the alcohol and organic acid are reacted to form the ester, and unreacted alcohol is removed as an alcohol-ester azeotrope.

Pugach et al (U.S. 5,502,240) discloses a process of making an esterification product in the presence of a heterogeneous titanium zeolite catalyst at a reaction temperature of 180° to 280° C.. The reaction mixture is cooled and excess alcohol is removed under vacuum and the esterified product is recovered after filtration.

Tong et al (U.S. 4,780,527) discloses a preparation of polyesters from terephthalic acid in a two-stage process: first, terephthalic acid and 1,4-butanediol are esterified in the presence of a

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catalyst such as an organo-tin compound and secondly the esterification product is subject to polycondensation.

McCready (U.S. 4,452,969) discloses a process of preparing polyalkylene dicarboxylates by reacting a dicarboxylic acid with an alkanediol in the presence of a titanium-containing chelate compound.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to T. Victor Oh whose telephone number is (703) 305-0809. The examiner can normally be reached on Monday through Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alan Rotman, can be reached on (703) 308-4698. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

von
9/25/12

Al-Oh,

CEILA CHANG
PRIMARY EXAMINER, *Acting SPE*
GROUP 1200 *625*